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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/576,957	05/24/2000	Atsushi Sakai	Q54388	5486

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EXAMINER
TRINH, MICHAEL MANH

ART UNIT	PAPER NUMBER
2822	

DATE MAILED: 05/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/576,957	SAKAI ET AL.	
	Examiner	Art Unit	
	Michael Trinh	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6,8-14 and 29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *29* is/are allowed.

6)☒ Claim(s) *6 and 8-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

*** This office action is in response to Applicant's amendment filed on April 29, 2003. Claims 1-5,7 and 15-28 were canceled. Claims 6,8-14 and 29 are pending, in which claim 29 have been newly added.

*** The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

1. Claims 6,8-14 are rejected under 35 U.S.C. 103 as being anticipated by Kenichi et al (JP-05047611) taken with Applicant admitted prior art (specification pages 3-4) and Nakamura et al (5,483,415) as evidence, and further of Robinson et al (5,795,647).

Kenichi et al teach a method for producing a solid electrolyte capacitor comprising a metal material having thereon a dielectric oxide film and a solid electrolyte formed on a desired portion of the dielectric film, the metal material having valve action (Figs 1-3, English abstract), wherein the method comprises the step of coating a masking material solution on the metal material 1 to form a plurality of masking layers 2 (Fig 1; Computer English translation, page 4 of 6), and a step of coating a second masking material solution by "electrodepositing a solution containing a polyamic salt at least a part of the valve-acting metal in the area where the solid electrolyte is not formed, thereby forming a polyamic acid film and dehydration-curing the film by heating" to form an electrodeposited polyimide second masking film 5, wherein the second masking material solution inherently infiltrates into the dielectric oxide film formed on the valve-metal substrate and forms a masking layer on the infiltrated portion (Figs 1-3; Computer English translation, 6 pages). Applicant's admitted prior art evidently teaches that the "method of forming a polyimide film by electro-deposition may successfully form a film even inside the pore parts" (see Applicant admitted prior art at specification pages 3-4 as evidence). Additionally, Nakamura et al '415 evidently teach (at figures 1-2 ; col 5, lines 22-42) coating a masking material solution by immersing the valve-acting tantalum metal into a liquid insulating substance so that the liquid solution infiltrates the porous chip and thus forming a masking layer on the infiltrated portion and thus preventing infiltration of a solid electrolyte formed in a subsequent step. Re further claims 8-9, wherein due to dehydration and curing, the masking resin polymer is solidified during coating, and preventing infiltration of a solid electrolyte

formed in a subsequent step, and wherein the polyamic acid solution forming the polyimide film as low molecular weight masking material solution is heat resistant resin. Re claim 11, aluminum for the metal is mentioned in the English abstract. Re claims 12,14, pyrrole and sulfonic salt for forming the solid electrolyte are mentioned by Kenichi .

Kenichi et al teach forming the masking polymer layer 5 by electrodepositing and forming masking layer 2 by screen-stencil; whereas, claim 6 recites forming by press contacting.

However, Robinson et al teach (at col 2, lines 15-27) to form a polymer layer by employing any of several conventional means including roll coating and electrocoating.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the polymer masking insulating layer of Kenichi by alternatively employing conventional techniques including roller coating (press contacting) or electrodepositing as taught by Robinson. This is because of the desirability and necessity to coat the masking polymer layer on portions of the substrate for mass-production, wherein these conventional techniques are alternative and proven for effectively coating of the polymer layer on the substrate.

Regarding claim 11, Kenichi teaches using aluminum for the metal material; and re claim 12, pyrrole and sulfonic salt for forming the solid electrolyte, but lacks listing other alterative materials as recited in claims 11,12, and 3,4-ethylenedioxythiophene as in claim 13, and mentioning mask solution containing silicon oil, silane coupling agent, or polyimidesiloxane as recited in claim 10.

Although these alternative materials are well known in the art for substitution, Applicant admitted prior art (present specification pages 2-4, 31, line 12+, page 37, line 15+; including teachings of the Japanese patent applications) teaches some other alternative materials, for example, titanium, aluminum, tantalum, 3,4-ethylenedioxythiophene (claim 13), silicone oil, polyimidesiloxane, etc.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Kenichi by employing these alternative materials as taught by Applicant admitted prior art and other materials as well known in the art. This is because the substitution of art recognized equivalent materials would have been within the level of one having ordinary skill in the art, wherein the masking layer formed entirely around an

entire circumference of the metal material prevents crawling up of the solid electrolyte during immersion and prevents shorting between anode and cathode.

2. Claims 6,8-11 are rejected under 35 U.S.C. 103 as being anticipated by Murayama et al (5,412,533) taken with Applicant admitted prior art (specification pages 2-4) and Nakamura et al (5,483,415) as evidences, and further of Cichanowski (4,499,520).

Murayama et al teach a method for producing a solid electrolyte capacitor comprising a porous metal body 1 having thereon a dielectric oxide film 8 and a solid electrolyte 10 formed on a desired portion of the dielectric film 8 (Fig 6; col 5, lines 30-55), the metal material having valve action, wherein the method comprises the step of coating a masking resin material solution on the porous metal material body 1 to form a first masking layers 12 and a step of coating a resin masking material solution to form a second masking layer 12 (Figs 11,9-10; col 6, lines 35-67; col 7, lines 9-23,46-57;Fig 19), wherein the resin masking layers 12 are formed after forming the dielectric oxide layer 8 (col 6, lines 55-66), wherein at least the step of forming the second masking layer causes infiltration of the resin masking material solution into the pores of the dielectric film 8 formed on the porous valve metal body 1 and formation of the resin masking layer on the infiltrated portion, inherently, and wherein the masking layers prevent crawling up of the solid electrolyte during immersion and shorting between anode and cathode. Applicant's admitted prior art evidently teaches that the "method of forming a polyimide film by electro-deposition may successfully form a film even inside the pore parts" (see Applicant admitted prior art at specification pages 3-4 as evidence). Furthermore, Nakamura et al '415 evidently teach (at figures 1-2 ; col 5, lines 22-42) coating a masking material solution of heat resistant resin by immersing the valve-acting tantalum metal into a liquid insulating substance so that the liquid solution infiltrates the porous chip and thus forming a masking layer on the infiltrated portion and thus preventing infiltration of a solid electrolyte formed in a subsequent step.

Murayama et al teach coating the first and second masking resin layers 12 on portions of the metal body, but lacks mentioning forming the masking layer by press contacting (claim 6).

However, Cichanowski teaches (at col 10, lines 1-10; Fig 1; col 9, line 55 through col 10) coating a polymer 11 onto a substrate by conventional techniques including brushing (press

contacting), roller coating (press contacting), dipping, spin coating, and drawing down (press contact).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the resin polymer masking insulating layer 13 of Murayama et al by employing conventional techniques including brushing (press contacting), roller coating (press contacting), and drawing down as taught by Cichanowski. This is because of the desirability and necessity to coat the masking polymer layer on portions of the substrate for mass-production, wherein these conventional techniques are alternative and proven for effectively coating of the polymer layer on the substrate.

Re further claims 8-11: Murayama et al teach using tantalum or niobium for the metal material (re claim 11; col 1, lines 9-15), and resin for the masking layer, wherein the resin masking material is heat resistant resin solution (claim 8; Nakamura '415 at col 5, lines 26-42), but lacks listing other alternative materials as recited in claims 9-11.

Although these alternative materials are well known in the art for substitution, Applicant admitted prior art (present specification pages 2-4; page 31, line 12+, including the Japanese patent applications) teaches some other alternative materials; for example, re claim 11, metal materials also include titanium, aluminum, or tantalum (page 2, lines 1-5); re claim 8-10, masking material solution includes resin, polyimide, polyamic acid (page 3, line 5 through page 4), wherein silicone oil, polyimidesiloxane, etc., are mentioned at page 31, line 12+, wherein due to dehydration and curing, the masking resin polymer is solidified during coating, and preventing infiltration of a solid electrolyte formed in a subsequent step, and wherein the polyamic acid solution forming the polyimide film as low molecular weight masking material solution is heat resistant resin.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Murayama by employing these alternative materials as taught by Applicant admitted prior art and other materials as well known in the art for substitution. This is because the substitution of art recognized equivalent materials would have been within the level of one having ordinary skill in the art, wherein the alternative metal materials are valve-acting metal that enable to form solid electrolytic capacitors, and wherein the

masking layers of these alternative resin materials prevent crawling up of the solid electrolyte during immersion and shorting between anode and cathode.

3. Claims 12-14 are rejected under 35 U.S.C. 103 as being anticipated by Murayama et al (5,412,533) with Applicant admitted prior art (specification pages 2-4) and Nakamura et al (5,483,415) as evidences, taken with Cichanowski (4,499,520), as applied above to claim 6, and further of and Kudoh et al (5,117,332).

The relied references including Murayama '415 teach a method for producing a solid electrolyte capacitor as applied above to claim 6.

Murayama teaches (at col 5, lines 45-67) using manganese dioxide for the solid electrolyte 10, but lacks listing other solid electrolytes as recited in claims 12-14.

However, Kudoh teaches (at col 5, line 56 through col 6, line 6) using solid electrolytes including pyrrole, thiophene, its derivatives, and sulfonic acid and their salts, instead of using manganese dioxide for the solid electrolyte (at col 1, lines 48-55), wherein 3,4-ethylenedioxythiophene is also mentioned by Applicant admitted prior art (page 37, lines 15+).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Murayama by employing these alternative materials as taught by Kudoh, Applicant admitted prior art, and other materials as well known in the art for substitution. This is because the substitution of art recognized equivalent solid electrolyte materials would have been within the level of one having ordinary skill in the art, wherein employing these alternative solid electrolytic materials in forming the solid electrolytic capacitors would improve high frequency characteristics and high reliability under high temperature and high humidity conditions.

Allowable Subject Matter

*** Claim 29 is allowed.

*** The following is an examiner's statement of reasons for allowance: None of the references of record including Murayama (5,412,533), Kudoh et al (5,117,332), Nakamura et al (5,483,415) fairly anticipatively suggest a method for forming a semiconductor device comprising all process limitations as claimed, or in the combination of the references, to fairly

make a prima facie obvious case of the claimed invention as recited in claim 29, wherein neither references teach or suggest linearly coating said masking material solution around the entire circumference and heating the solution to form the first masking layer; subjecting an area where a solid electrolyte is formed later to electrochemical forming; further linearly coating the masking solution around the entire circumference at a distance from the first masking layer on the electrochemically formed metal material, and heating the solution to form the second masking layer; forming a solid electrolyte in the are exclusive of the spacer between the masking layers out of the area subjected to the electrochemical forming; and cutting the metal materials in the space between the first and second masking layers.

Specification

*** The disclosure is objected to because of the following informalities:

In the specification page 20, lines 1-2, the phrase "the second masking layer (4)..." is typing error and incorrect and should be --a solid electrolyte layer (4)--, since it is "the solid electrolyte layer (4)" as mentioned throughout at specification page 20, line 15; page 12, line 9, and Figures 2-4.

Appropriate correction is required.

Response to Amendment

4. Applicant's Amendment and remarks filed April 29, 2003 have been fully considered but they are moot of new ground of rejection.

*** After reconsideration of newly added claim 29, which is corresponding to original claim 7, and amended claims 8-14 as depending on claim 6, restriction requirement with respect to non-elected claim 7-14 are hereby *withdrawn*. Group II claims 7-14 is now rejoined to the elected invention of Group I, claims 1-6. The canceled, nonelected claim 7 may be reinstated by applicant if timely submitted in an amendment responding to this office action. Upon entry of the amendment, such amended claim(s) will be examined for patentability under 37 CFR 1.104. In view of the withdrawal of the restriction requirement as above, applicant(s) are advised that if any claims 7-14 be presented in a continuation or divisional application, such claims may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of

the instant application. Once the restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 44 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

*** The indicated allowability of claim 6 is withdrawn in view of the reference of Murayama (5,412,533) and English translation of Kenichi (JP-05047611). Rejections bases on the references are applied as above.

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*** Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael M. Trinh whose telephone number is (703) 308-2554. The examiner can normally be reached on M-F: 8:30 Am to 5:00 Pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (703) 308-4905. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Oacs

Michael Trinh
Primary Examiner